

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2017/2018

BMM 1014 – MATHEMATICS FOR MANAGERS (All Sections / Groups)

5 JUNE 2018
2.30 p.m. to 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 6 pages with 4 questions only.
2. Attempt all **FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.
4. Formulae are attached at the end of the question paper.

QUESTION 1

(a) Ms. Farhana sells special print T-shirts at the craft carnival at the tourism site in Melaka. Her cost of selling the T-shirt is $C(x) = 15x + 45$. The T-shirts is sold at RM30 each.

(i) Find the revenue function of the T-shirts. (2 marks)

(ii) Find the profit or loss if Ms. Farhana managed to sell 20 T-shirts. (4 marks)

(iii) Find the break-even level of the T-shirts. (3 marks)

(iv) If Ms. Farhana was able to sell 100 T-shirts, what price should be charged in order for her to get a profit of RM1500? (3 marks)

(b) The shipping charges for an online shoes store are RM2 for a pair of shoes, RM3 for two pairs of shoes and RM3.5 for three to five pairs of shoes. The company received a total of 6400 orders last week. It has been estimated that the total shipping charges for these order were RM16,800. The number of shipment with RM3 charges was 1000 less than the number shipment with RM3.5 charges. Find the number of shipments made in each category of the order of the shoes. (13 marks)

(Total: 25 marks)

Continued...

QUESTION 2

A factory manufactures two products which are Product X and Product Y. Each of which must pass through two production processes at machine A and machine B. Product X requires 5 hours at machine A and 4 hours at machine B, while product Y requires 5 hours at machine A and 2 hours at machine B. The maximum capacity of machine A for a certain period is 6000 hours and, due to cost and manpower agreement, machine B must be used for at least 3600 hours over the same period. Due to sales agreement, at least 700 units of Product X must be produced, while a maximum of 600 units of Product Y will be produced over the given period. Product X has a profit of RM10 and Product Y has a profit of RM14.

(a) Formulate the above problem as a Linear Programming problem. (7 marks)

(b) Graph and show the feasible region of the above problem clearly. (6 marks)

(c) Find the optimal solution and the associated maximum total profit. (12 marks)

(Total: 25 marks)

Continued...

QUESTION 3

(a) How long will it take for an amount of RM 15,000 to yield RM 1337.50 at a simple interest rate 8% per annum? (4 marks)

(b) If an amount of RM6,000 is invested at 7.5% compounded quarterly for five years, find the amount at the end of five years and what is the total interest earned? (5 marks)

(c) Jimmy saved RM1,500 in a bank account that pays interest at 3.6% compounded continuously four years ago. What is the amount in his account now? (4 marks)

(d) Mary bought a house with a price of RM300,000. She paid 20% of the down payment and the balance is settled in a loan of 30-year which charged 5.25 % compounded monthly.

(i) Find her monthly payment.
(ii) What was the loan outstanding if she had paid for 10 years? (12 marks)

(Total: 25 marks)

Continued...

QUESTION 4

(a) Find the derivative of $x^2\sqrt{x^3 - 15x}$. (5 marks)

(b) The demand of a company selling x unit of children school bag is given by $p = 100 - 0.2x$. The total costs of selling the bags is $C(x) = 800 + 30x$.

- (i) Find the revenue function. (2 marks)
- (ii) Find the profit function. (2 marks)
- (iii) Find the level of x that maximise the profit of the company. (4 marks)

(c) A company producing two types of fishing rod, namely Type A and Type B. The profit function is given by

$$P(x, y) = -x^2 - 2y^2 + 2xy - 4x + 12y + 6$$

where x denotes thousand units of type A fishing rod and y denotes thousand units of type B fishing rod produced and sold. Find the number of units of type A and type B fishing rod that need to be produced and sold if the company wants to maximise its profit.

(12 marks)

(Total: 25 marks)

Continued...

LIST OF FORMULA

1. Quadratic Formula

The solution of the equation:

$$ax^2 + bx + c = 0, \\ a \neq 0, \text{ are } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

2. Simple Interest

Interest, $I = Prt$ (P = principal, r = interest rate, t = number of years)
 Accumulated amount, $A = P (1 + rt)$

3. Compound Interest

Accumulated amount, $A = P (1 + i)^n$, where $i = r/m$, and $n = mt$ (m = number of conversion periods per year)

4. Continuous Compound Interest

$$A = Pe^{rt}$$

5. Effective Rate of Interest

$$r_{\text{eff}} = (1 + r/m)^m - 1$$

6. Present Value for Compound Interest

$$P = A (1 + i)^{-n}$$

7. Future Value of an Annuity

$$S = R \left[\frac{(1+i)^n - 1}{i} \right]$$

(S = future value of ordinary annuity of n payments of R dollars periodic payment)

8. Present Value of an Annuity

$$P = R \left[\frac{1 - (1+i)^{-n}}{i} \right]$$

(P = present value of ordinary annuity of n payments of R dollars periodic payment)

Continued...

9. Amortization Formula

$$R = \left[\frac{Pi}{1 - (1 + i)^{-n}} \right] \quad (R = \text{periodic payment on a loan of } P \text{ dollars to be amortized over } n \text{ periods})$$

10. Sinking Fund Formula

$$R = \left[\frac{Si}{(1 + i)^n - 1} \right] \quad (R = \text{periodic payment required to accumulate } S \text{ dollars over } n \text{ periods})$$

Calculus

11. Product rule

$$f(x) = u(x) \cdot v(x)$$

$$f'(x) = u(x) \cdot \frac{dv}{dx} + v(x) \cdot \frac{du}{dx}$$

12. Quotient rule

$$f(x) = \frac{u(x)}{v(x)}$$

$$f'(x) = \frac{v(x) \frac{du}{dx} - u(x) \frac{dv}{dx}}{[v(x)]^2}$$

End of Paper